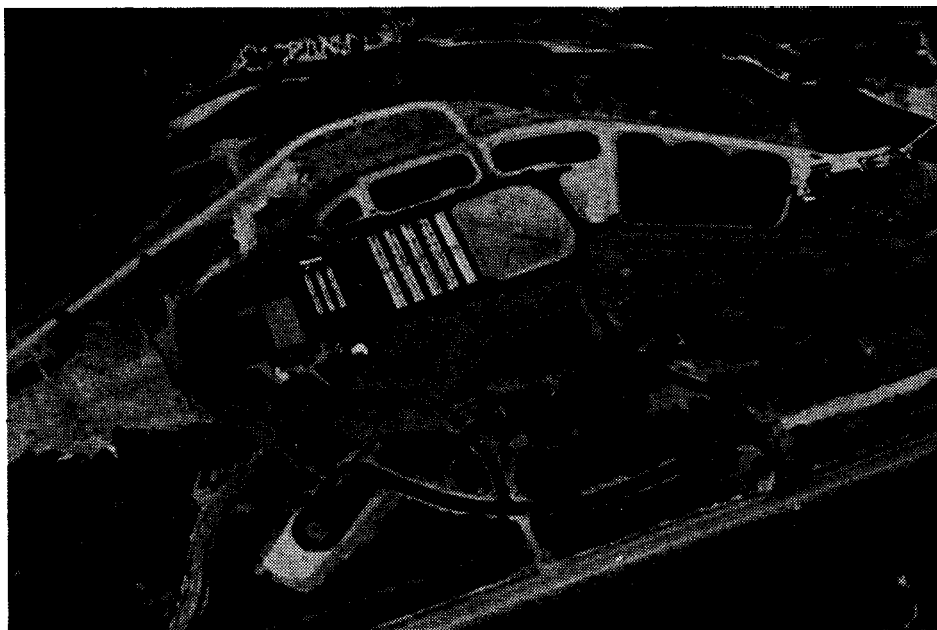




## **SAWTOOTH FISH HATCHERY AND EAST FORK SATELLITE**

**1989 Spring Chinook Salmon Brood Year  
1990 Steelhead Brood Year**



by

**Richard D. Alsager, Fish Hatchery Superintendent III**

**March 1993**

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## SAWTOOTH FISH HATCHERY AND EAST FORK SATELLITE

### ABSTRACT

The Sawtooth Fish Hatchery was put into operation in 1985 to produce spring chinook salmon and steelhead for production programs at Sawtooth, Hagerman National, and Magic Valley hatcheries. A satellite facility on the East Fork of the Salmon River augments this program.

Sawtooth Fish Hatchery personnel trapped 888 spring chinook adults between June 7 and September 11, 1990. There were 137 females spawned yielding 747,500 green eggs. There were 470 jacks, males, and females released to spawn naturally.

The East Fork facility trapped 128 adult chinook between June 7 and September 7, 1990. Twenty females were spawned, producing 118,400 green eggs. Sixty-nine jacks, males, and females were released upriver.

All eggs were incubated and reared at Sawtooth Hatchery. From the 747,500 green eggs, Sawtooth released 652,600 smolts. There were 98,300 smolts released at the East Fork from the 118,400 green eggs taken.

The Sawtooth Hatchery trapped 1,056 A-run steelhead between March 5 and May 7, 1990. A total of 358 fish were released upstream to spawn naturally. There were 226 females spawned for a green egg take of 1,071,165 eggs.

The East Fork satellite trapped 454 B-run steelhead between March 22 and April 30, 1990. A total of 121 fish were released upstream to spawn naturally. There were 465,675 green eggs taken.

All eggs were incubated at Sawtooth Hatchery. An additional 726,830 Pahsimeroi green eggs were incubated at Sawtooth to supplement Sawtooth Hatchery needs. After eye-up and picking, the eggs were shipped to Hagerman National and Magic Valley hatcheries.

Brood year 1990 was stocked at Sawtooth and East Fork facilities during April 1991. Sawtooth received 1,344,500 A-run smolts. East Fork received 1,508,533 B-run smolts. Excess Dworshak B-runs provided the majority of the East Fork stocking.

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## **HATCHERY DESCRIPTION**

Sawtooth Fish Hatchery is part of the Lower Snake River Compensation Plan and has been in operation since 1985. Mitigation goals for the hatchery is 19,000 adult spring chinook over Lower Granite Dam and the hatchery has the capacity for 2,400,000 spring chinook smolts and 4,500,000 steelhead eggs (the steelhead eggs are shipped to and reared at Hagerman National and Magic Valley hatcheries). A satellite station located on the East Fork of the Salmon River includes trapping, holding, and spawning facilities for salmon and steelhead.

The hatchery receives its water from the Salmon River and three production wells. The wells provide 7.8 cubic feet per second (cfs) and maintain a minimum temperature of 40°F in winter and up to 50°F during the latter part of the summer. The river provides up to 55 cfs of water with temperature variations from 32°F to 68°F. Rearing water from the river enters an intake structure located one-half mile upstream from the hatchery building, and runs through a 54 inch pipe to a control box located in the hatchery building where final screening is accomplished. Water is then distributed to the indoor vats, outside raceways, or adult fish facility. Incubation water is provided by two production wells or river water. Back-up to the incubators is gravity flow river water through a check valve from the control box. Inside vats may utilize either well or river water, or both, with excess well water spilled back into the control box for use in the outside raceways.

Production facilities include: 100 stacks of FAL incubators containing 800 trays; 16 indoor rearing vats, each with 400 cubic feet of rearing space; 12 outside fry raceways, each with 750 cubic feet of rearing space; and 28 final rearing raceways, each with 2,700 cubic feet of rearing space. The lower sections of the final rearing raceways have serial re-use water from the top sections. The adult fish facility consists of a weir, fish trap, three adult holding ponds each with 4,500 cubic feet of holding area, and a spawning area located at the upper end of the holding ponds.

## **1989 ADULT SPRING CHINOOK RETURNS**

Returning adults to Sawtooth Hatchery in 1989 resulted from natural escapement, smolt releases in 1986 and 1987, and jacks returning from the 1988 release (Appendix 1). The Sawtooth fish weir and trap was put into operation on May 23, 1989 and was operated through September 11, 1989. The fish trap was checked daily, and fish were transferred to the adult holding ponds or released upstream of the weir to spawn naturally. A total of 888 spring chinook salmon were trapped (Appendices 2 and 3), which included 672 males and 216 females. We held 275 males and 143 females for spawning, while the remaining 397 males and 73 females were released upstream of the weir to spawn naturally. Poned fish were injected with erythromycin phosphate at a rate of 5 mg for each pound of fish weight to help control Bacterial Kidney Disease (BKD).

Adult chinook returning to the East Fork were from natural escapement, from smolts released in 1986 and 1987, and jacks returning from 1988 releases, (Appendix 1).

Trapping of chinook salmon at the East Fork facility began on June 7, 1989 and continued through September 7, 1989. The trap was checked daily, and the fish were transferred to the holding ponds or released above the velocity barrier to spawn naturally. A total of 128 salmon were trapped (Appendices 4 and 5),

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which included 98 males and 30 females. We held 39 males and 20 females for spawning and released 59 males and 10 females above the velocity barrier to spawn naturally.

### **Adult Spring Chinook Coded-Wire-Tag Recoveries**

All adult spring chinook were examined for fin clips and tags. We collected 32 coded-wire-tagged (CWT) fish at Sawtooth with 5 being 3-year-olds (1986 brood year), 17 being 4-year-olds (1985 brood year), and 4 being 5-year-olds (1984 brood year), and the other having no tag. We also collected 7 Sawtooth fish from fall releases that had left ventral (LV) clips. Five of the LV-clipped fish were estimated by length to be 3-year-olds and 2 were 4-year-olds.

### **Prespawning Mortality**

Prespawning mortality included all ponded males and females that died before spawning. Sawtooth ponded 448 adult spring chinook and 20 were lost to prespawning mortality (4.8%), of which 14 were males and 6 were females. The East Fork ponded 59 adult spring chinook and 3 were lost to prespawning mortality (5.1%), of which all were males.

### **Chinook Spawning**

Spawning operations began at Sawtooth on July 31, 1989 and continued on a bi-weekly basis through September 6, 1989. A total of 137 females were spawned for a total egg-take of 733,365 green eggs; 5,353 eggs per female.

East Fork spawning began on August 4, 1989 and continued bi-weekly through September 9, 1989. A total of 20 females were spawned for a total of 121,854 green eggs; 6,093 eggs per female.

Chinook eggs were taken by incision of the female with eggs placed in a colander to drain off the ovarian fluid. Eggs from two females were then put into a spawning bucket and fertilized by the sperm of two males. The eggs were rinsed in well water and water-hardened in a 200 ppm iodophor solution for one hour.

### **Disease Sampling**

Normal disease sampling was done by the hatchery crew at both East Fork and Sawtooth. In 1989, we also started a BKD experiment and adult/egg segregation. Each male and female was sampled. Ovarian fluid and kidney samples were taken from the females and kidney and spleen samples were taken from the males. Eggs from each two pair were held separately, and then eggs from high and low BKD infected parents were separated from the rest of the production eggs. This segregation seemed to reduce BKD mortalities from all the production raceways and concentrate it in the high BKD raceways throughout the rearing cycle. Mortalities in the high BKD raceways were 2 to 3 times higher than the production raceways.

### Carcass Disposition

Sawtooth and East Fork salmon carcasses were checked for coded wire tags, then placed in freezer boxes and stored in the freezer trailer until the end of the salmon season. They were then hauled to the landfill and buried.

### Chinook Eggs

After fertilization and water-hardening, eggs were placed into incubators with the water flow set at 5 gpm. Incubation temperatures ranged between 40°F and 50°F. To prevent fungus growth, eggs were treated with formalin five days a week at a concentration of 1,667 ppm. This treatment was discontinued after the eggs were eyed and picked.

An eye-up of 91.1% was obtained for Sawtooth and 83.9% for East Fork eggs. Eyed eggs were re-measured into the incubators at 85 ounces per tray and began to hatch at 900 temperature units.

### Chinook Fry

The swim-up fry were moved to the indoor rearing vats at approximately 1,675 temperature units. Fry were placed into the vats at an average of 60,000 fish per vat in 400 cubic feet of rearing space. Initial feeding was begun with Bio-Diet and OMP IV starter mash. The fry were fed Bio-Diet and OMP IV until they could be fed 1/16 OMP IV exclusively. Baffles were inserted every four feet with a total of 11 baffles in each vat. This enabled the hatchery crew to reduce daily cleaning time, reduce stress on the small fry, keep their feed suspended longer in the water column for better conversion, and create a more sanitary condition for fish culture. Due to a density experiment, three replications of 30,000, 60,000, and 100,000 chinook were loaded in nine vats. This experiment was continued through the rearing season to the outside raceways.

All OMP IV feed through 3/64-inch and Bio-Diet through 1.6 mm was enhanced with ten times the normal pantothenic acid and vitamin C to help prevent "spring thing" mortality.

All chinook were fed the first erythromycin feeding while still in the inside vats, just prior to moving them outside.

### Chinook Fingerlings

The 1989 brood year chinook were moved from the early rearing vats to the outside raceways starting May 10, 1990, with the last of the fish moved out at the end of the month. The fingerlings averaged 250 fish per pound and were placed in 1,700 cubic feet of rearing space at 2.0 cfs of water flow per raceway. Fingerlings were switched to OMP IV 1/16-inch at 200 fish per pound, then to 3/32-inch at 100 fish per pound. OMP IV 1/8-inch pellets were fed as the fish reached 50 fish per pound until they were released. In August 1990, we stocked 2,000 fingerlings in the upper Salmon River at Hell Roaring Creek. These fish were 25 fish per pound.

On July 2 and 12, we received excess Rapid River spring chinook totalling 548,800 fish. These fish were reared at Sawtooth and then stocked in the Yankee Fork of the Salmon River. We stocked 50,000 (111 fish/lb) in the Yankee Fork

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dredge ponds on July 20, with 491,000 (45 fish/lb) being stocked on October 10, 1990 directly in the Yankee Fork.

### Chinook Smolts

In March 1991, chinook smolts were evaluated for condition and disease by the Idaho Department of Fish and Game pathologist. The smolts were found to be in generally excellent condition with no mortality due to disease outbreaks other than some BKD losses in the high BKD segregated raceways (Table 1). This was consistent throughout the entire rearing cycle.

Whirling Disease was found in the pre-release smolts, but at a low incidence and causing no fish mortality.

The following results were found using the Goede and Houghton (1985) autopsy-based fish health/condition assessment system:

Table 1. Sawtooth stock Summary of Normals.

Eyes	98%
Gills	100%
Pseudobranchs	100%
Thymus	100%
Mesentery Fat	75%
Spleen	87%
Kidney	100%
Liver	88%
Bile	65%
Hind Gut	100%

Remarks: East Fork stock were generally the same readings.

Fish due to be released in the spring of 1991 were fed a second erythromycin feeding in September and then marked in October. Marks used were CWT/adipose clip, PIT-tags, and freeze brands, with two-thirds of our fish being marked in some way.

On March 13 and 15, 1991, the screens and boards were pulled on the Sawtooth stock for spring-released fish, with a total of 650,600 smolts released in the Salmon River. These smolts averaged 26.3 fish per pound, or 24,738 pounds of fish. The East Fork smolts, which totaled 98,300, were planted in the East Fork of the Salmon River on March 5, 1991. They averaged 30.7 fish per pound, or 3,200 pounds of fish. Of those chinook released in the spring minus mortality, 13,515 were PIT-tagged, 58,515 were freeze branded, and 380,157 were CWT.

Total survival from green eggs to release was: Sawtooth stock 89.0% and East Fork stock 80.7% (Table 2).

Table 2. Survival from green eggs to release.

Green Eggs	Eyed Eggs	%	Swim-Up	%	Released	%
Sawtooth 733,365	668,373	91.13	667,900	91.1	652,600	89.0
East Fork 121,854	102,195	83.9	100,900	82.8	98,300	80.7

### Production Costs

The cost of producing chinook eggs, fry, and smolts is summarized in Table 3. An overall conversion of 1.88 was attained on both Sawtooth and East Fork spring chinook during the rearing period (Table 3). Overall conversion for Rapid River spring chinook was 1.83.

Table 3. Production costs.

Lbs of fish produced	Lbs of feed fed	Feed cost	Conversion	Cost per lb produced
34,324	68,641	\$26,072	1.88	\$.76
Personnel Costs	\$371,654			
Operating Costs	396,110			
Capital Outlay	26,059			
Program Total	\$793,823			

Program's total costs estimated for entire 18-month rearing cycle and include entire hatchery program, both steelhead and chinook.

### 1990 ADULT STEELHEAD RETURNS

The 1990 Sawtooth steelhead adult returns were from 687,634 smolts released in 1987 and 1,253,445 released in 1988. These fish were reared and stocked by Hagerman National and Magic Valley hatcheries (Appendix 12). Some of the returns were from 717,559 fry stocked by Sawtooth Hatchery in 1987 and 555,200 fry stocked in 1988. Naturally-spawning fish also contributed to the run.

The 1990 East Fork steelhead adult returns were from 525,316 smolts released in 1986, 485,078 released in 1987, and 303,564 released in 1988 (Appendix 12). These fish were reared and stocked by Hagerman National Hatchery. Some returns were from naturally-spawning fish.

The Sawtooth fish trap was put into operation on March 2, 1990 and operated through May 7, 1990. A total of 1,056 adult steelhead were trapped (Appendices 14-17), which included 716 males and 340 females.

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The East Fork trap was put into operation on March 22, 1990 and operated through April 30, 1990. A total of 454 adult steelhead were trapped (Appendices 18-21), including 300 males and 154 females.

#### **Adult Steelhead Coded-Wire-Tag Returns**

Adult steelhead were examined for clips, marks, or tags before being released or spawned. Sixteen CWT fish returned to Sawtooth, with 11 being 3-year-olds (1987 brood year), 3 being 4-year-olds (1986 brood year), and 1 being a 5-year-old (1985 brood year). East Fork had 10 CWT fish return, with 2 being 3-year-olds (1987 brood year) and 7 being 4-year-olds (1986 brood year). Each station had one fish return that was clipped but had no tag.

#### **Steelhead Spawning**

Sawtooth spawning operations began April 3, 1990 and continued through May 1, 1990. In nine spawning days, 226 females were spawned. The green egg-take was 1,071,165 eggs, or 4,734 eggs per female. These green eggs yielded 956,245 eyed eggs for an eye-up of 89.3%.

East Fork spawning began April 2, 1990 and continued through April 23, 1990. In six spawning days, 105 females yielded 537,015 green eggs for a 5,114 eggs per female average. These green eggs yielded 465,675 eyed eggs for an eye-up of 86.7%.

Eggs were stripped from the females into colanders and the ovarian fluid drained off. They were then fertilized in spawning buckets on a one to one ratio, then added to another pairs' eggs to form two fish pools. The eggs were rinsed with well water then hardened in a 200 ppm iodophor solution before incubation. All eyed eggs were shipped to Hagerman National and Magic Valley hatcheries.

#### **Disease Sampling**

All Sawtooth "A" eggs shipped to Hagerman National were sampled for virus, and only those eggs from negative parents were shipped. Each female's ovarian fluid and each male's spleen and kidney were sampled and sent to Dworshak Disease Lab for testing. Other disease samples taken were 60 EIBS, 60 BRD, 60 ovarian, and 20 whirling. Two of the 2-fish pools tested virus positive. The same samples were taken at the East Fork. No virus was found.

#### **Fish Disposition**

At Sawtooth, 696 kelts were given to the public, and 358 fish were released to spawn naturally. We also gave 331 kelts to the public from the East Fork trap and released 121 to spawn naturally (Appendix 13).

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### Steelhead Eggs

Eggs were incubated in Heath incubator trays at 70 oz, or 16,000 eggs per tray. After two days, eggs were treated with a 1,667 ppm formalin solution for 15 minutes five times a week for fungal and bacterial control. The eggs eyed-up around 380 TU's, at which time they were shocked and machine picked.

Sawtooth Hatchery took a total of 1,071,165 green eggs resulting in 956,245 eyed eggs giving an eye-up of 89.3%. East Fork took 537,015 green eggs, resulting in 465,765 eyed eggs giving a 86.7% eye-up. The hatchery also disease sampled and incubated 726,830 green Pahsimeroi eggs. These eggs eyed-up at 88%, yielding 639,340 eyed eggs. These eggs were used to fill Sawtooth Hatchery egg needs.

An additional 2.8 million Pahsimeroi eggs were incubated. 1.6 million eggs eyed-up for a 56.1% eye-up.

All eyed eggs were shipped to Hagerman National, Magic Valley, and Niagara Springs hatcheries. Disease positive eggs (a total of 17,300) were disposed of in the Stanley landfill.

### Stocking

Hagerman National and Magic Valley hatcheries stocked 1990 brood year smolts at Sawtooth and East Fork facilities from April 9 through April 19, 1991. Sawtooth received 979,799 "A" smolts from Hagerman National, 364,700 "A" smolts from Magic Valley and the East Fork received 967,800 "B" smolts from Magic Valley. An additional 540,733 Dworshak "B" fingerlings were stocked from Hagerman National along the East Fork in September 1990, and 304,907 Hagerman National fingerlings were stocked during October 1990 above Sawtooth Hatchery.

## ACKNOWLEDGEMENTS

This report was completed by Rick Alsager, Fish Hatchery Superintendent III; Phil Coonts, Fish Hatchery Superintendent I; and Nannette Neider, Fisheries Technician.

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## **A P P E N D I C E S**

Appendix 1. Sawtooth Hatchery and East Fork chinook smolt releases and adult returns, 1989.

Brood year	Release year	Number released	Adult returns			Total returns	Percent
			Jacks	2-Ocean	3-Ocean		
Sawtooth Hatchery							
1979	1981	None			291		Inc.
1980	1982	None	17	66	165	248	Inc.
1981	1983	185,375	49	1,182	796	2,027	1.08
1982	1984	230,550	292	922	875	2,086	.91
1983	1985	420,060	51	452	1,318	1,821	.43
1984	1986	347,484	17	86	190	293	.08
1985	1987	1,185,06	80	286	164	530	.05
1986	1987-88	1,705,500	412	1,212	(1991)	Inc.	
1987	1988-89	2,092,000	112	(1991)	(1992)	Inc.	
1988	1989-90	1,895,600	(1991)	(1992)	(1993)	Inc.	
1989	1990-91	652,600	(1992)	(1993)	(1994)	Inc.	
East Fork Facility							
1979	1981	*			69	69	Inc.
1980	1982	*		26	59	85	Inc.
1981	1983	*	22	193	102	317	Inc.
1982	1984	*	51	87	181	319	Inc.
1983	1985	*	5	90	519	614	Inc.
1984	1986	108,690	1	23	51	75	.07
1985	1987	195,100	6	55	27	88	.05
1986	1988	249,200	22	106	(1991)		Inc.
1987	1989	305,300	12	(1991)	(1992)		Inc.
1988	1990	514,600	(1991)	(1992)	(1993)	Inc.	
1989	1991	98,300	(1992)	(1993)	(1994)		Inc.

\* Adult returns include an unknown number of natural fish and are based on these lengths: Less than 65 cm - Jacks, 65 cm to 83 cm - 4-year-olds, 84 cm and larger - 5-year-olds.

Appendix 2. Spring chinook trapped, spawned, and fish disposition at Sawtooth Hatchery.

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Spring Chinook Trapped and Spawned

Fish trapped:	888	Fish released:	470
Males:	260	Males:	104
Females:	216	Females:	73
Jacks:	412	Jacks:	293
Total:	888	Total:	470

Chinook Age Class

<u>Age</u>	<u>Sex</u>	<u>Number</u>
3-year-old	Jack	412
4-year-old	Male	166
4-year-old	Female	120
5-year-old	Male	94
5-year-old	Female	96
	Total	888

Fish Disposition:

Released:	470	
Spawned and/or killed:	418	(Includes spawned fish, mortality, and CWT recoveries.)
Total:	888	

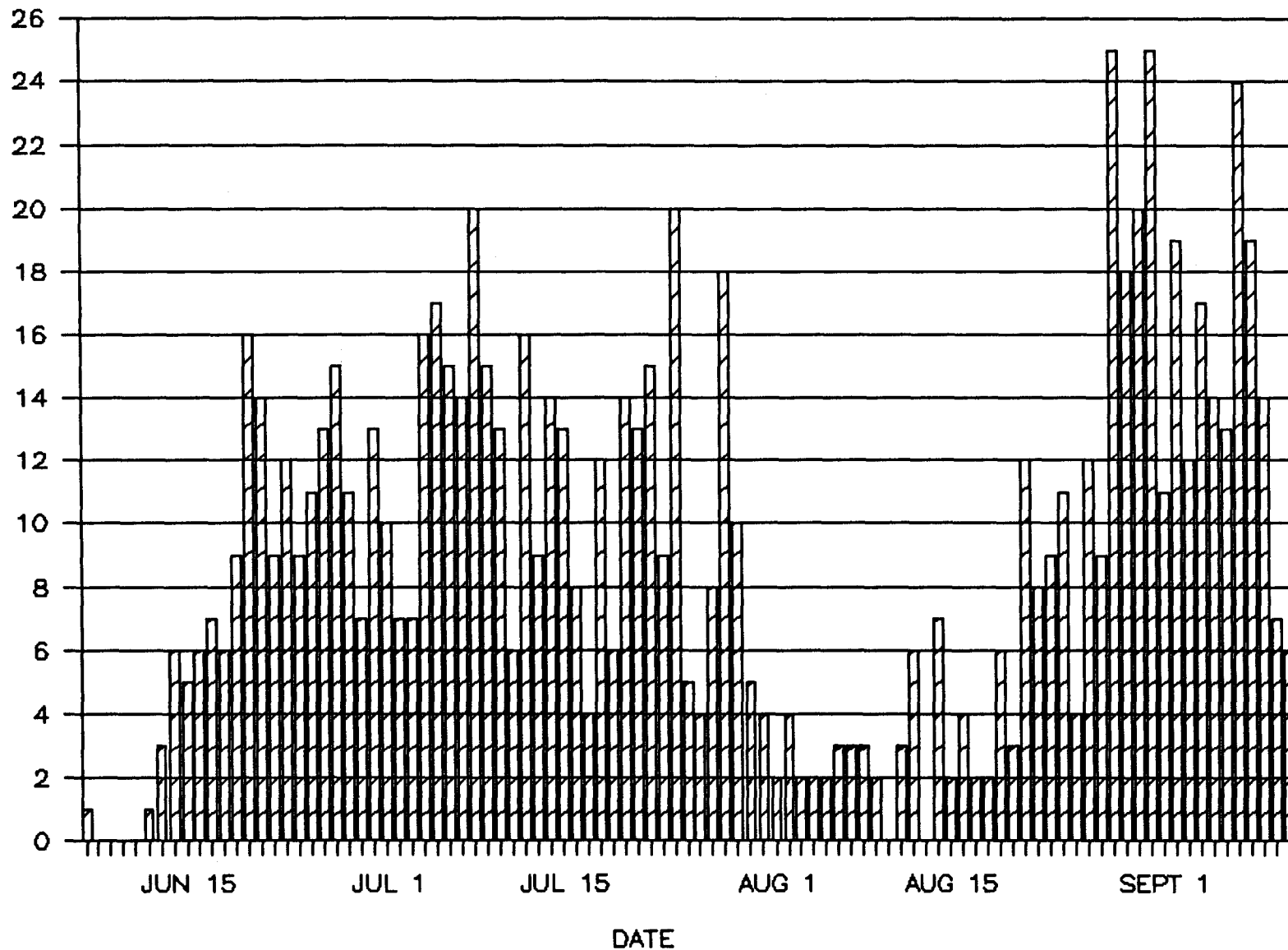
All chinook carcasses were put into the freezer trailer and hauled to a landfill and buried. A total of 32 CWT snouts were sent in for examination.

Age class is based on length frequency information: Less than 65 cm - Jacks, 65 cm to 83 cm - 4-year-olds, 84 cm and larger - 5-year-olds.

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# SAWTOOTH SPRING CHINOOK DAILY RUN TOTAL

1989 — Number of fish — 888



Appendix 3. Run timing of adult spring chinook, Sawtooth.

Appendix 4. Spring chinook trapped, spawned, and fish disposition at East Fork Satellite.

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Spring Chinook Trapped and Spawned

Fish trapped:	128	Fish released:	69
Males:	76	Males:	46
Females:	30	Females:	10
Jacks:	22	Jacks:	13
Total:	128	Total:	69

Chinook Age Class

<u>Age</u>	<u>Sex</u>	<u>Number</u>
3-year-old	Jack	22
4-year-old	Male	44
4-year-old	Female	11
5-year-old	Male	32
5-year-old	Female	19
	Total	128

Fish Disposition:

Released:	69	
Spawned and/or killed:	59	(Includes spawned fish, mortality, and CWT recoveries.)
Total:	128	

All chinook carcasses were put into the freezer trailer and hauled to a landfill and buried. A total of 2 CWT snouts were sent in for examination.

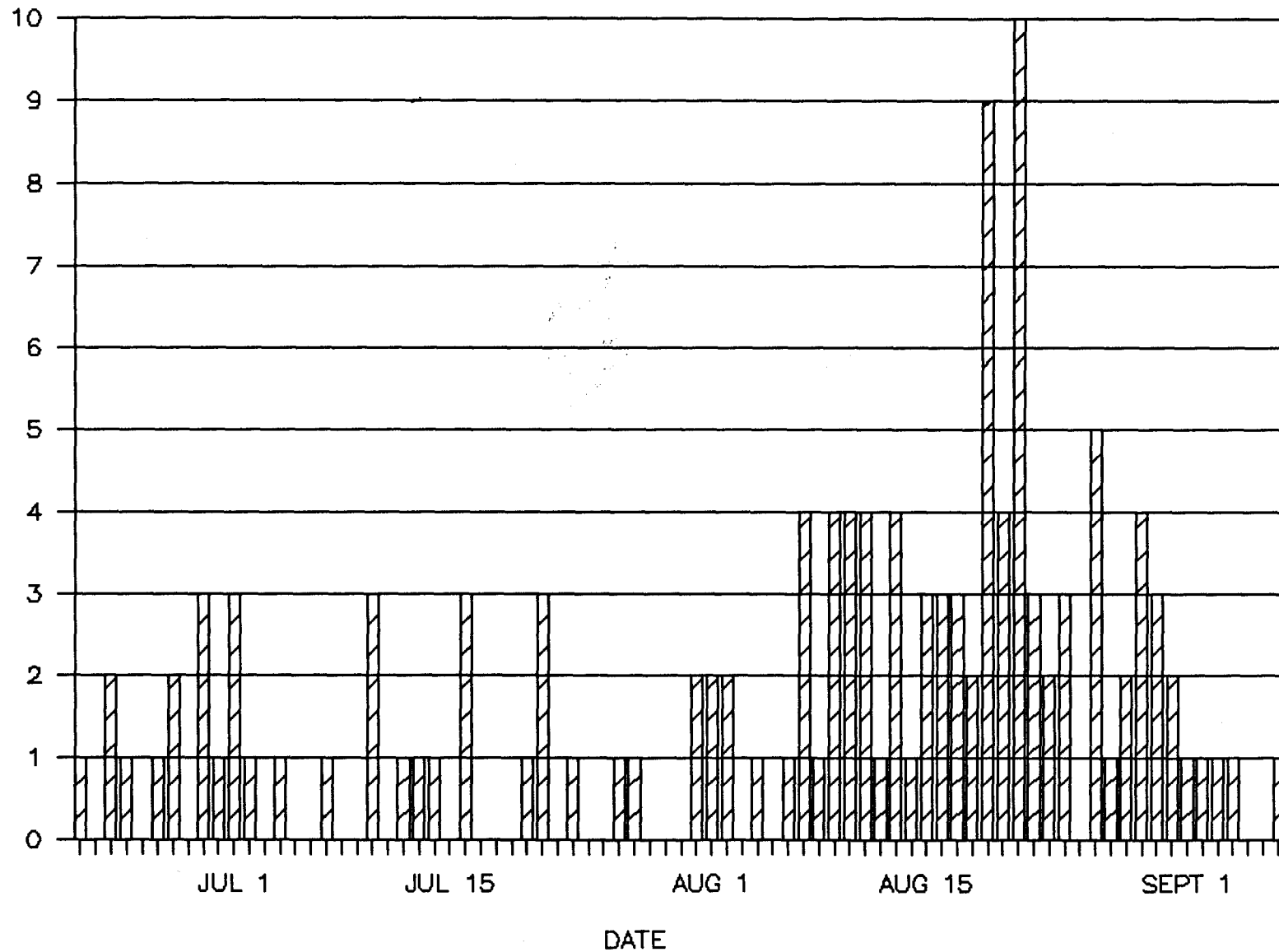
Age class is based on length frequency information: Less than 65 cm - Jacks, 65 cm to 83 cm - 4-year-olds, 84 cm and larger - 5-year-olds.

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# EAST FK. SPRING CHINOOK DAILY RUN TOTAL

1989 — Number of fish = 128

15  
NUMBER OF FISH



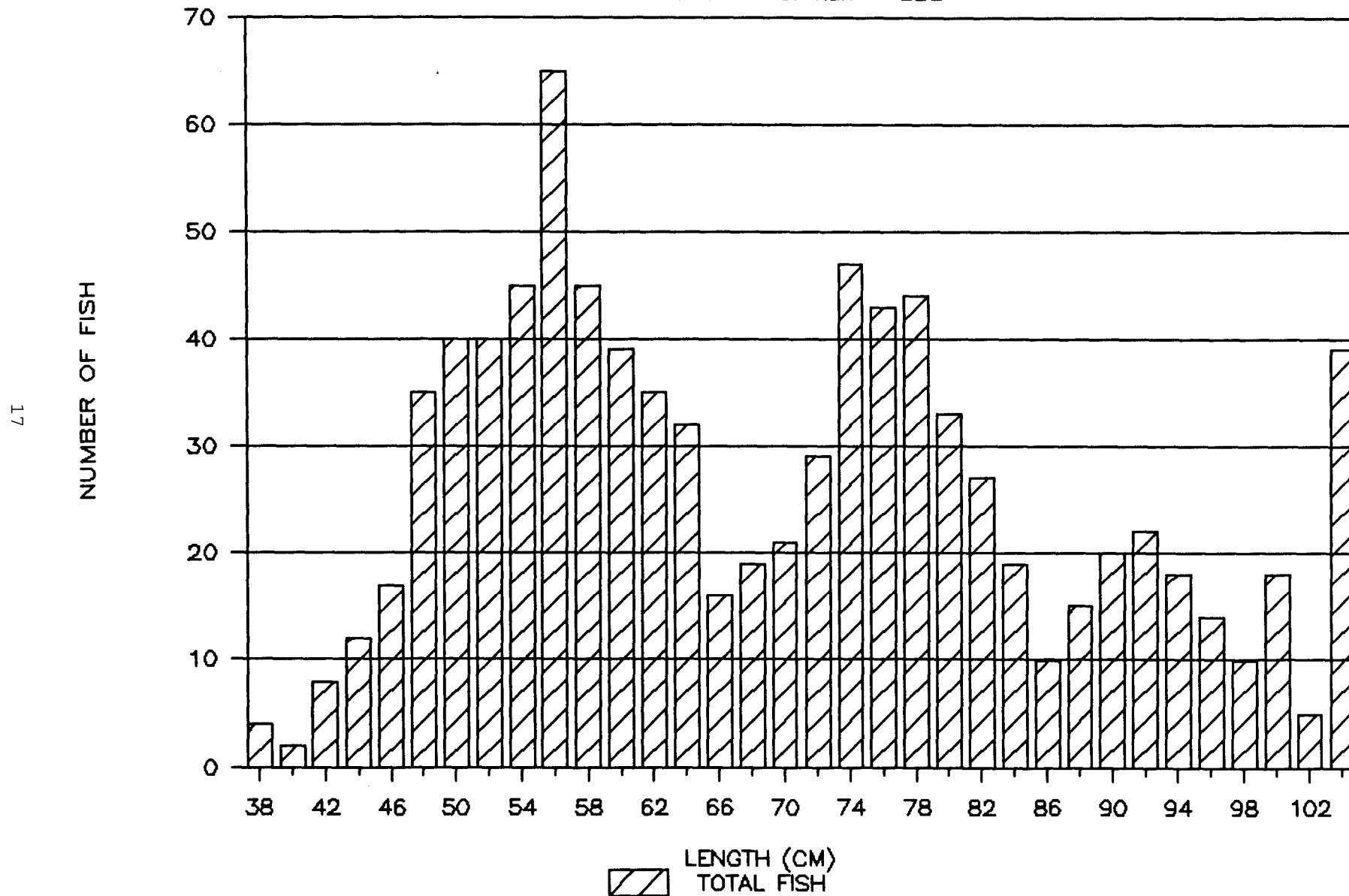
Appendix 5. Run timing of adult spring chinook, East Fork.

Appendix 6. Length frequency distribution of Sawtooth chinook, 1989.

	Fish trapped	Males	Females	Length (in)	Length (cm)
	4	4	0	14.91	38
	2	2	0	15.75	40
	8	8	0	16.54	42
	12	12	0	17.32	44
	17	17	0	18.11	46
	35	35	0	18.91	48
	40	40	0	19.69	50
	40	40	0	21.26	52
	45	45	0	21.67	54
	65	65	0	22.05	56
	45	45	0	22.83	58
	39	36	3	23.62	60
	35	35	0	24.41	62
	32	28	4	25.19	64
	16	15	1	25.98	66
	19	11	8	26.77	68
	21	13	8	27.56	70
	29	18	11	28.35	72
	47	26	21	29.13	74
	43	23	20	29.92	76
	44	29	15	30.71	78
	33	17	16	31.51	80
	27	14	13	32.28	82
	19	14	5	33.07	84
	10	3	7	33.85	86
	15	4	11	34.65	88
	20	5	15	35.43	90
	22	5	17	36.22	92
	18	6	12	37.01	94
	14	4	10	37.81	96
	10	1	9	38.58	98
	18	12	6	39.37	100
	5	4	1	40.16	102
	39	36	3	20.95	104
Totals	888	672	216		

# SAWTOOTH SP. CHINOOK LENGTH FREQUENCY

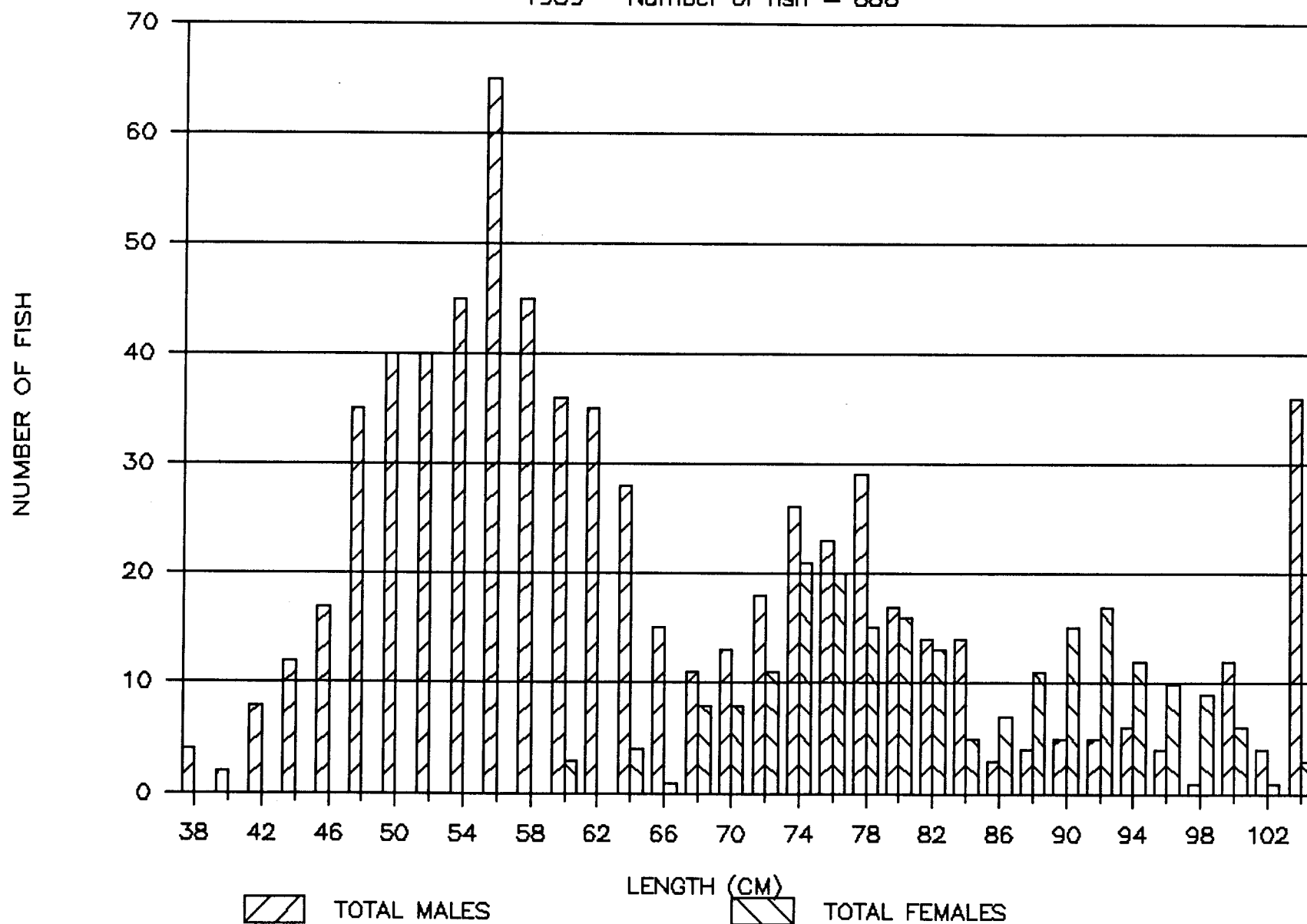
1989 - Number of fish = 888



Appendix 7. Adult spring chinook length frequency, Sawtooth.

# SAWTOOTH SP. CHINOOK LENGTH FREQUENCY

1989 - Number of fish = 888



Appendix 8. Adult spring chinook length frequency, males and females, Sawtooth.

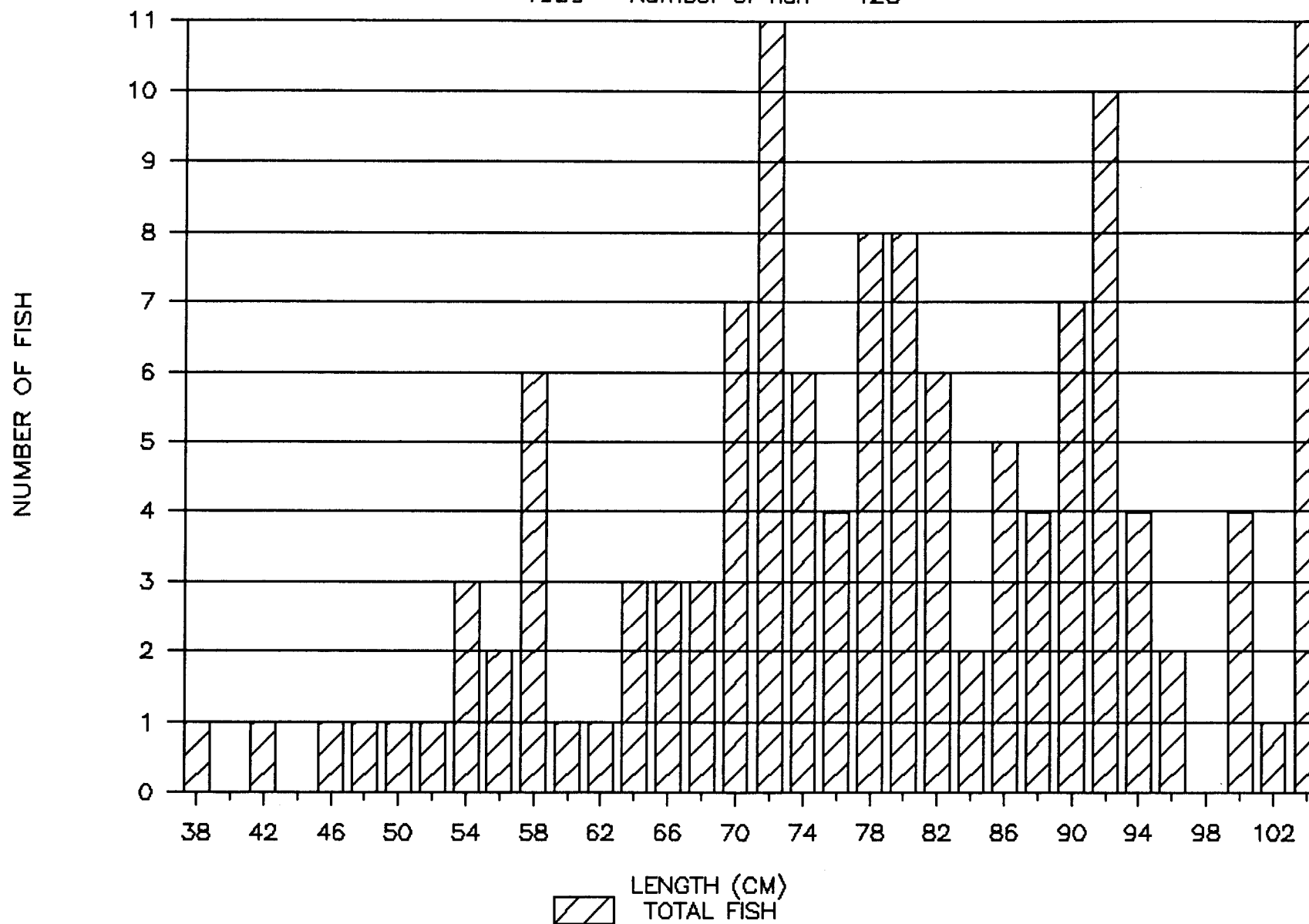
Appendix 9. Length frequency distribution of East Fork chinook, 1989.

	Fish trapped	Males	Females	Length (in)	Length (cm)
	1	1	0	14.91	38
	0	0	0	15.75	40
	1	1	0	16.54	42
	0	0	0	17.32	44
	1	1	0	18.11	46
	1	1	0	18.91	48
	1	1	0	19.69	50
	1	1	0	21.26	52
	3	3	0	21.67	54
	2	2	0	22.05	56
	6	6	0	22.83	60
	1	1	0	23.62	60
	1	1	0	24.41	62
	3	3	0	25.19	64
	3	3	0	25.98	66
	3	2	1	26.77	68
	7	7	0	27.56	70
	11	9	2	28.35	72
	6	6	0	29.13	74
	4	1	3	29.92	76
	8	7	1	30.71	78
	8	6	2	31.51	80
	6	3	3	32.28	82
	2	2	0	33.07	84
	5	3	2	33.85	86
	4	3	1	34.65	88
	7	2	5	35.43	90
	10	5	5	36.22	92
	4	2	2	37.01	94
	2	1	1	37.81	96
	0	0	0	38.58	98
	4	4	0	39.37	100
	1	1	0	40.16	102
	11	9	2	20.95	104
Totals	128	98	30		

8990BYRT

# EAST FORK SP. CHINOOK LENGTH FREQUENCY

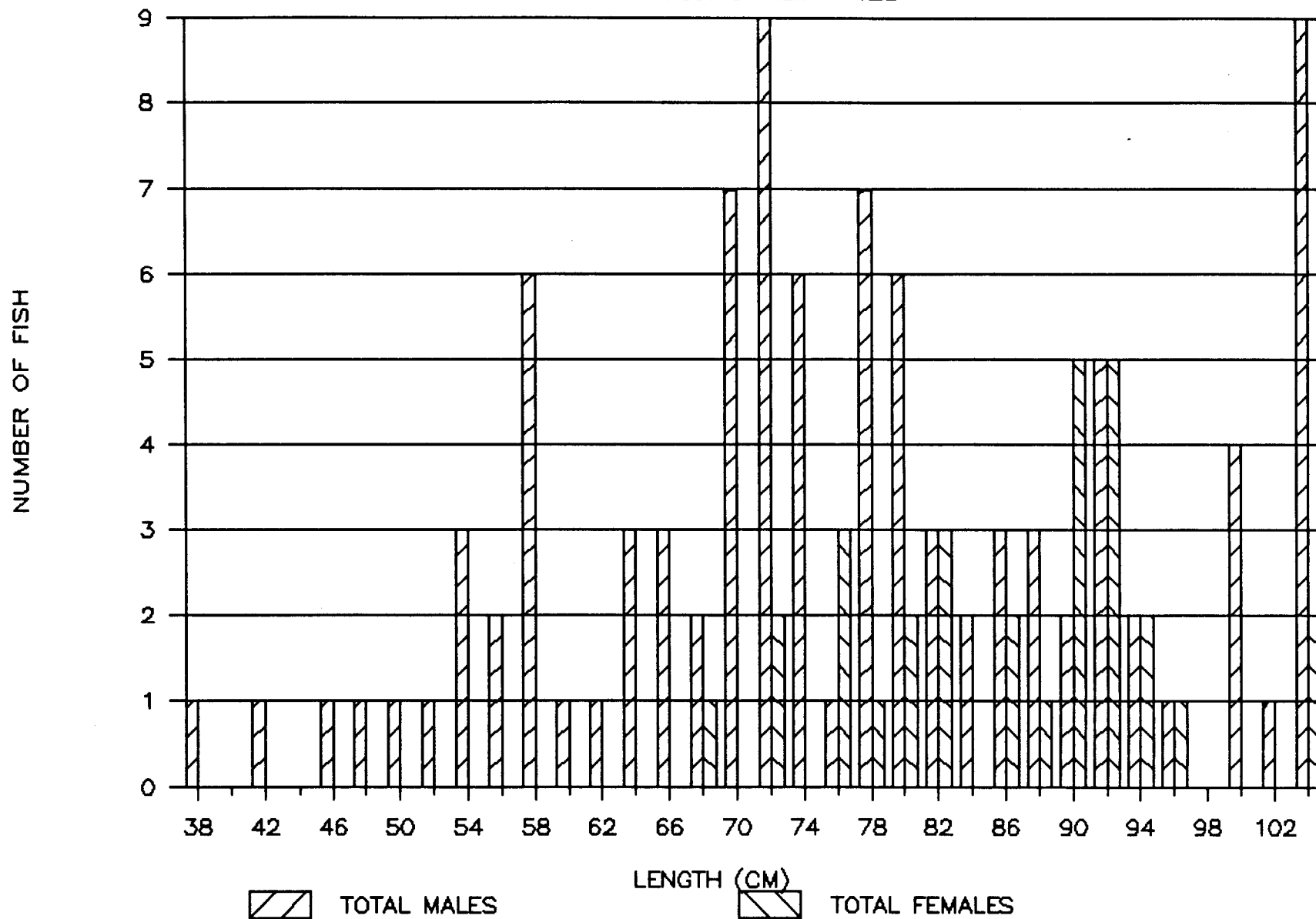
1989 — Number of fish = 128



Appendix 10. Adult spring chinook length frequency, East Fork.

# EAST FORK SP. CHINOOK LENGTH FREQUENCY

1989 — Number of fish = 128



Appendix 11. Adult spring chinook length frequency, males and females, East Fork.

Appendix 12. Steelhead smolt releases to bring 1990 adults.

Date released	Hatchery rearin <sup>g</sup>	Number	Marks	Stock
Sawtooth				
1987	HNFB	51,887	RD-R-2	A
1987	HNFB	25,579	102948 LV	A
1987	HNFB	610,168	NONE	A
1988	HNFB	50,903	LD-T-2	A
1988	HNFB	52,624	102939 LV	A
1988	MV	57,700	NONE	A
1988	HNFB	1,092,218	NONE	A
Total		1,941,079		
East Fork				
1986	HNFB	444,552	NONE	B
1986	HNFB	28,932	102820 LV	B
1986	HNFB	51,832	LD-T-4	B
1987	HNFB	24,769	102949	B
1987	HNFB	460,309	NONE	B
1988	HNFB	52,387	102938 LV	B
1988	HNFB	251,177	NONE	B
Total		1,313,958		

Sawtooth Fish Hatchery

Fish Disposition:	<u>Males</u>	<u>Females</u>
Prespawning mortality	7	0
Spawned	227	226
Killed but not spawned	238	0
Released	<u>224</u>	<u>114</u>
	716	340

## East Fork Satellite

Fish Disposition:	Males	Females
Prespawning mortality	5	0
Spawned	108	105
Killed but not spawned	113	2
Released	<u>74</u>	<u>47</u>
	300	154

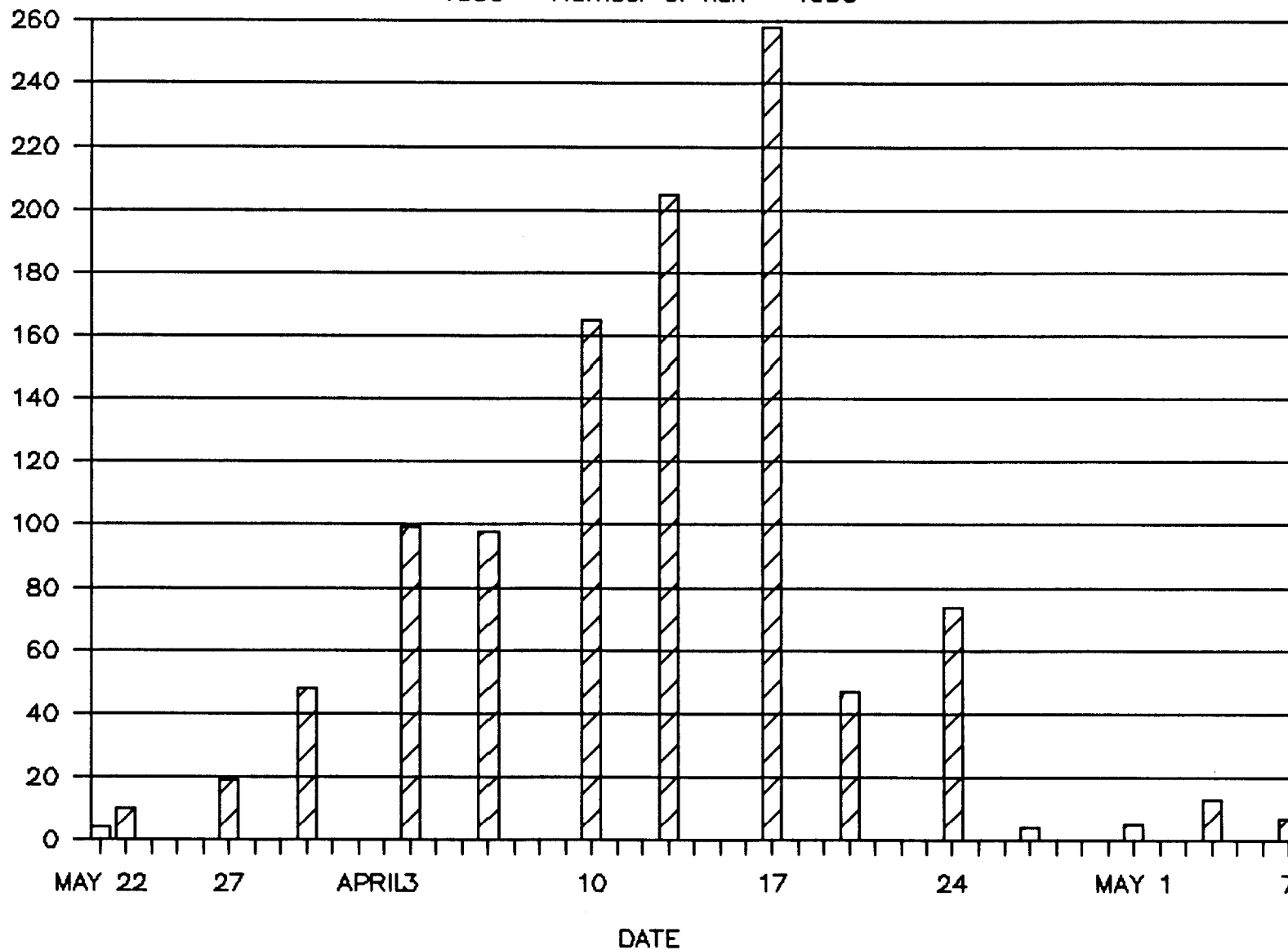
8990BYRT

# DAILY RUN TOTALS FOR SAWTOOTH STEELHEAD

1990 — Number of fish = 1056

100

NUMBER OF FISH



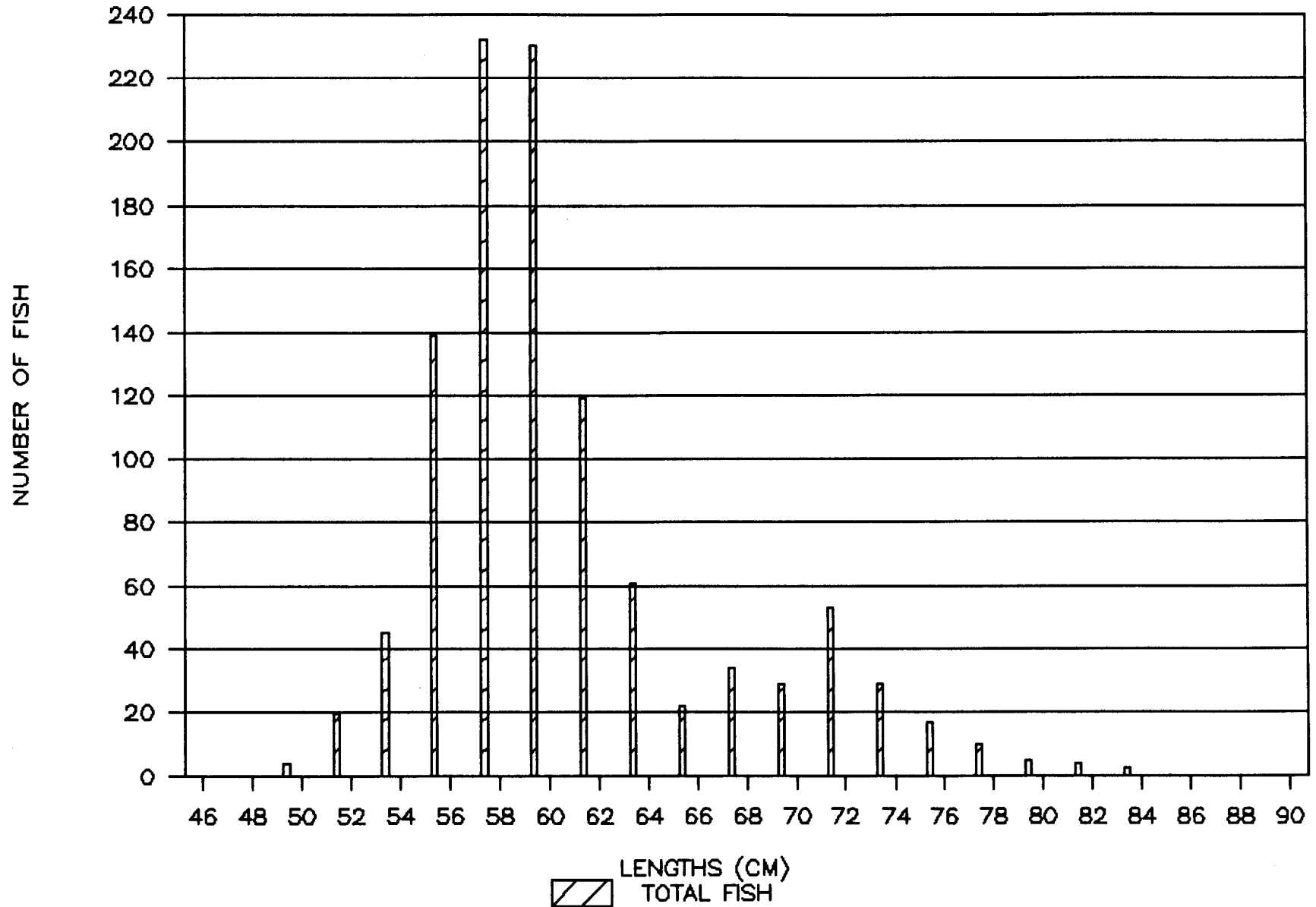
Appendix 14. Adult steelhead run timing, Sawtooth.

Appendix 15. Length frequency distribution of Sawtooth steelhead, 1990.

Length (cm)	Hatchery males	Wild males	Hatchery females	Wild females	Total
46					
48					
50	4				4
52	15	1	4		20
54	29		16		45
56	88		50	1	139
58	154	5	69	4	232
60	167	8	54	1	230
62	96	3	18	2	119
64	48	4	8	1	61
66	13		9		22
68	9	1	16	8	34
70	6		17	6	29
72	16	5	22	10	53
74	8	6	11	4	29
76	9	2	3	3	17
78	7	1	1	1	10
80	3	2			5
82	3	1			4
84	3			1	3
86					
88					
90					
Total	677	39	298	42	1,056

# LENGTH FREQUENCY FOR SAWTOOTH STEELHEAD

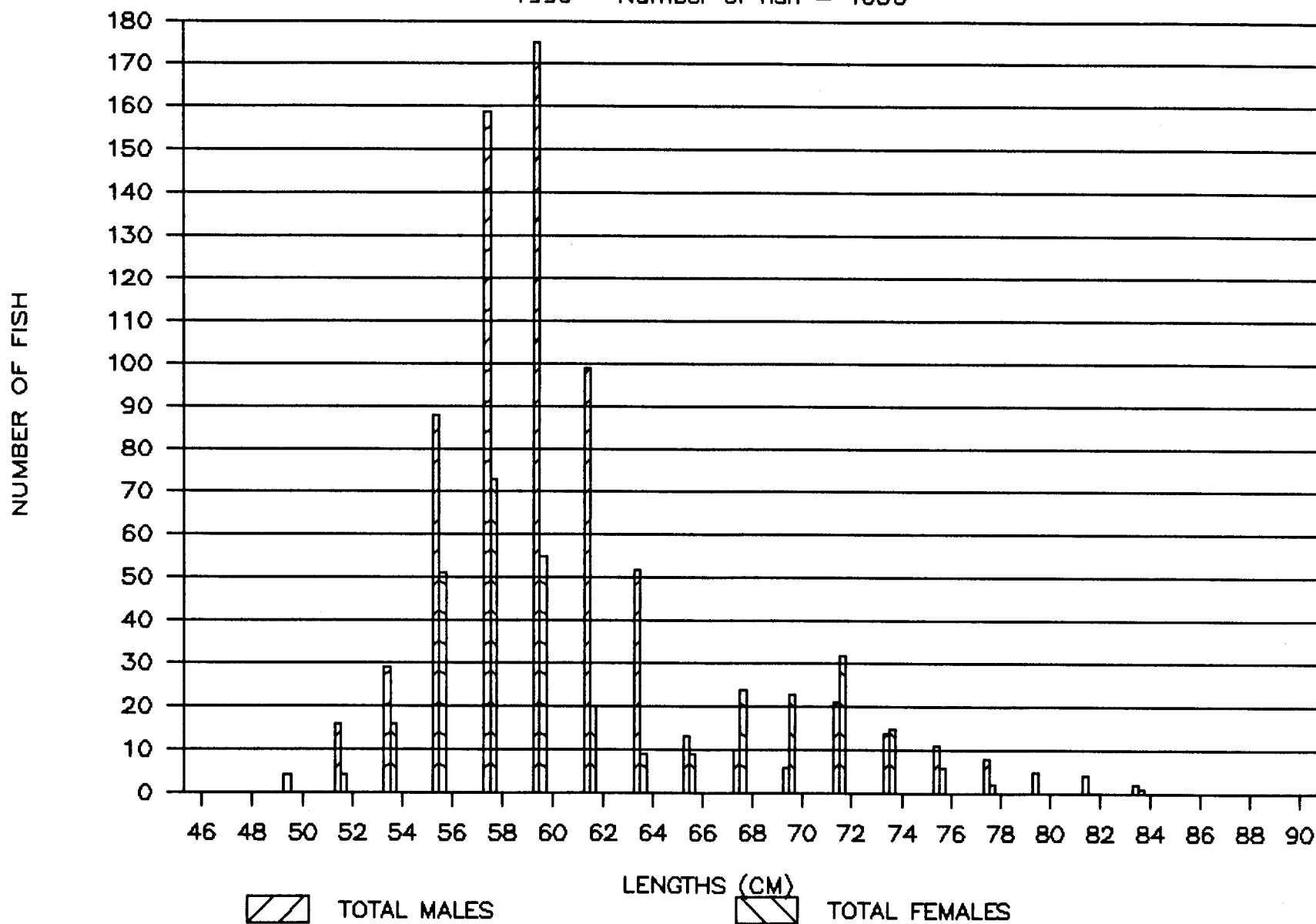
1990 — Number of fish — 1056



Appendix 16. Adult steelhead length frequency, Sawtooth.

# LENGTH FREQUENCY FOR SAWTOOTH STEELHEAD

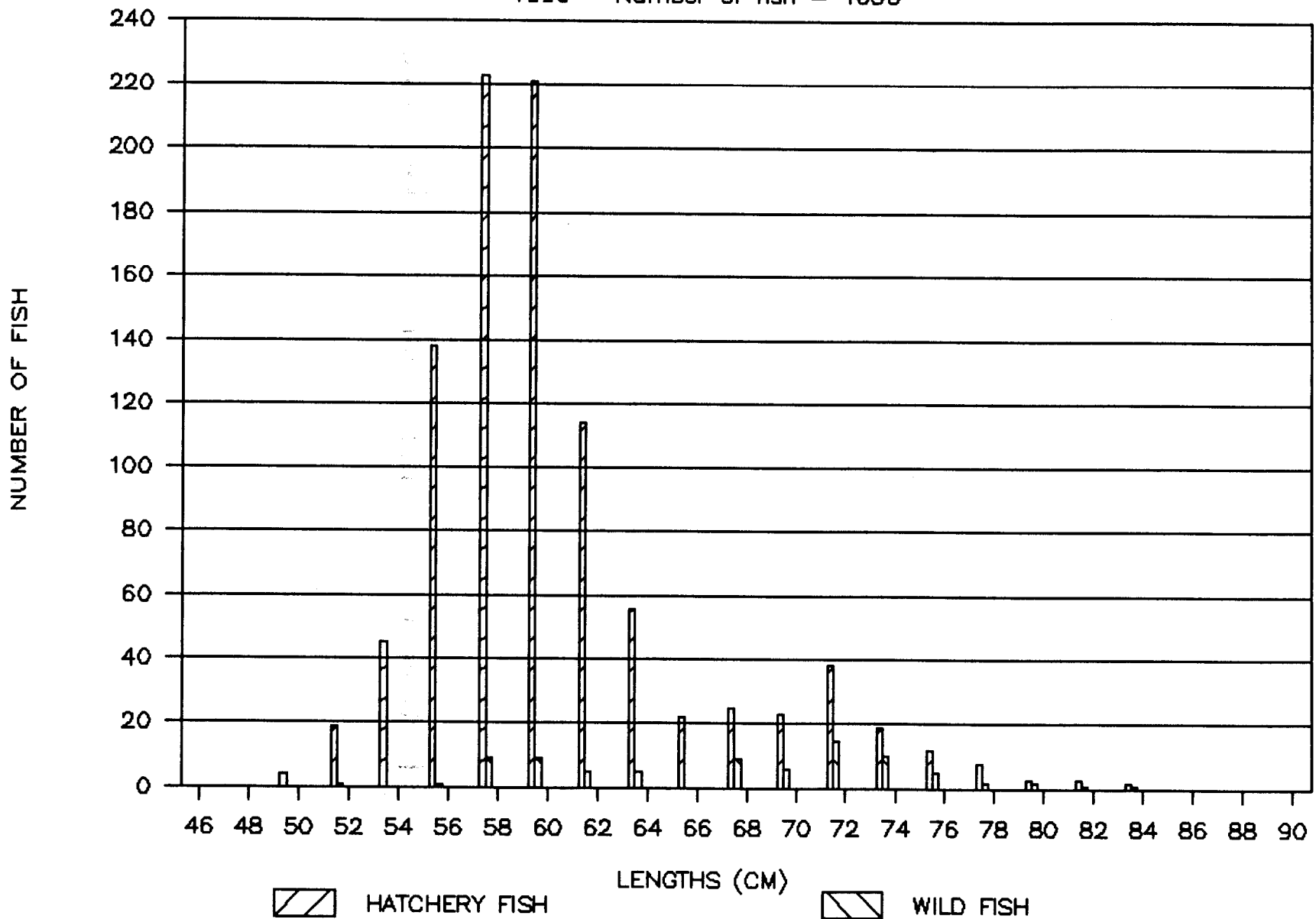
1990 — Number of fish = 1056



Appendix 17. Adult steelhead length frequency, males and females, Sawtooth.

# SAWTOOTH HATCHERY VS WILD STEELHEAD

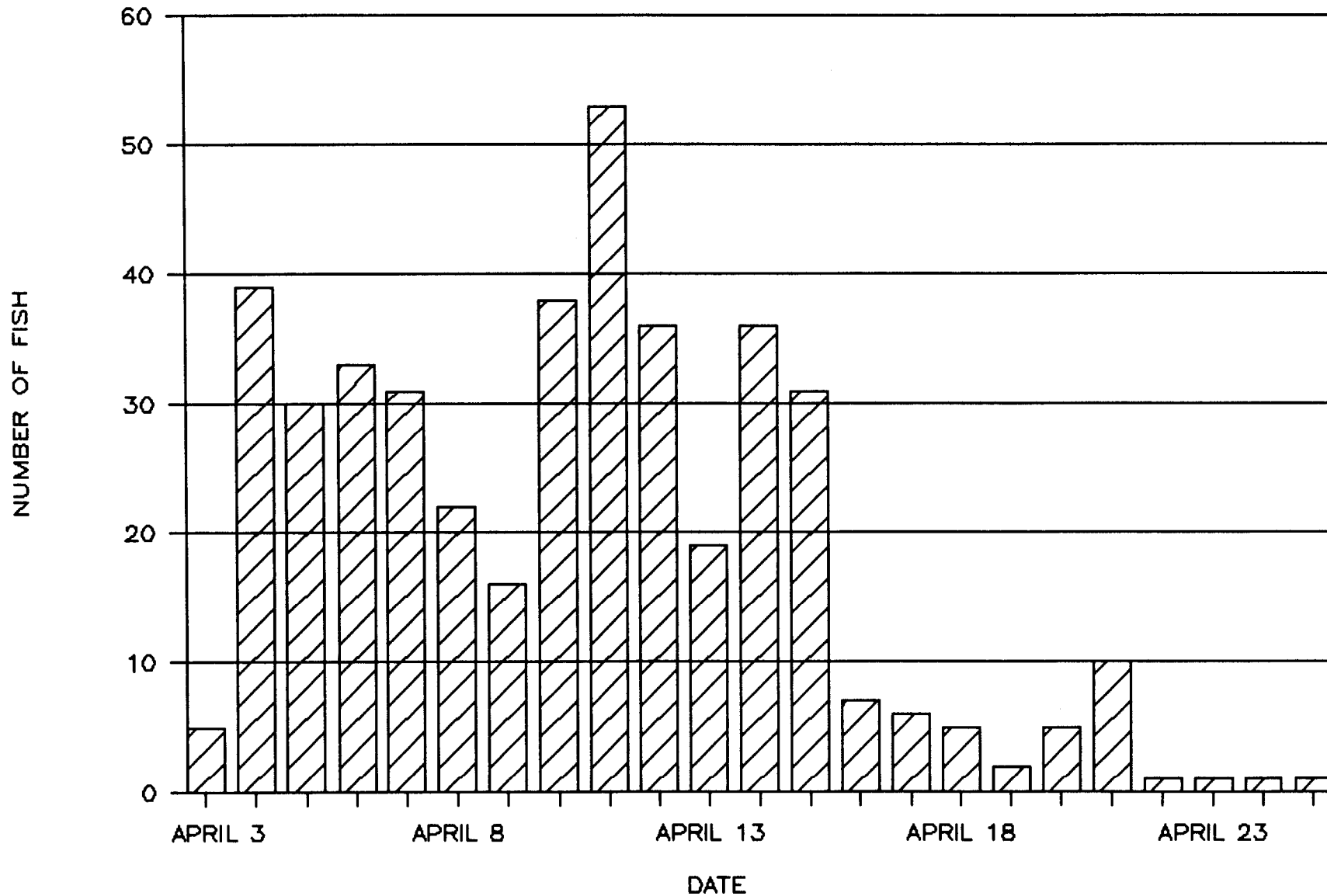
1990 - Number of fish = 1056



Appendix 18. Adult steelhead length frequency, hatchery vs wild, Sawtooth.

# DAILY RUN TOTALS FOR EAST FK. STEELHEAD

1990 - Number of fish = 454



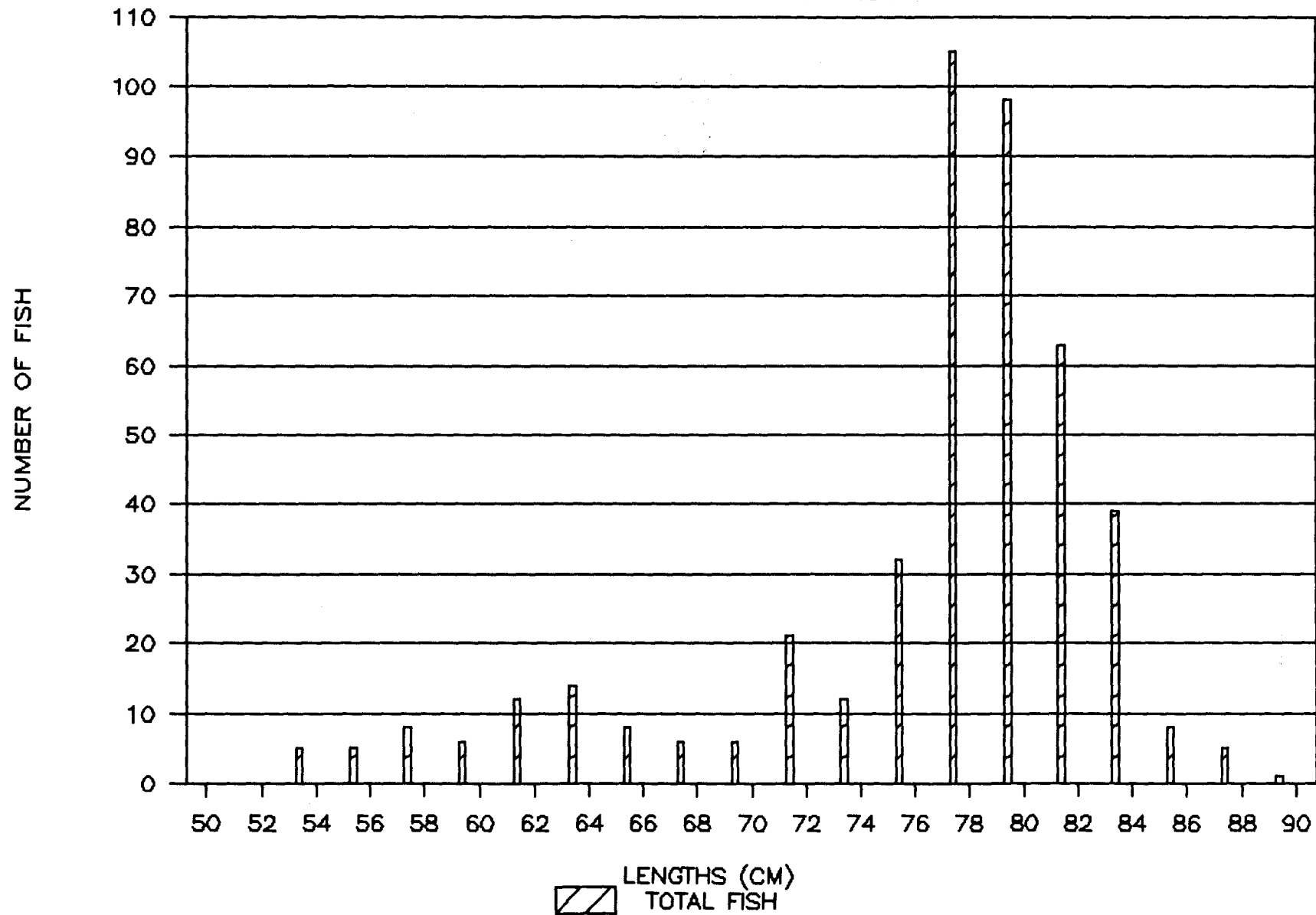
Appendix 19. Adult steelhead run timing, East Fork.

Appendix 20. Length frequency distribution of East Fork ateelhead, 1990.

Length (cm)	Hatchery males	Wild males	Hatchery females	Wild females	Total
50					
52					
54	1		2	2	5
56	3	1	1		5
58	2		4	2	8
60	5		1		6
62	11		1		12
64	13	1			14
66	7		1		8
68	2	1	3		6
70	1		4	1	6
72	6		10	5	21
74	4		6	2	12
76	16	1	14	1	32
78	56	1	48		105
80	72	2	21	3	98
82	51		11	1	63
84	31		8		39
86	7		1		8
88	3	1	1		5
90	1				1
92					
94					
Total	292	8	137	17	454

# LENGTH FREQUENCY FOR EAST FK. STEELHEAD

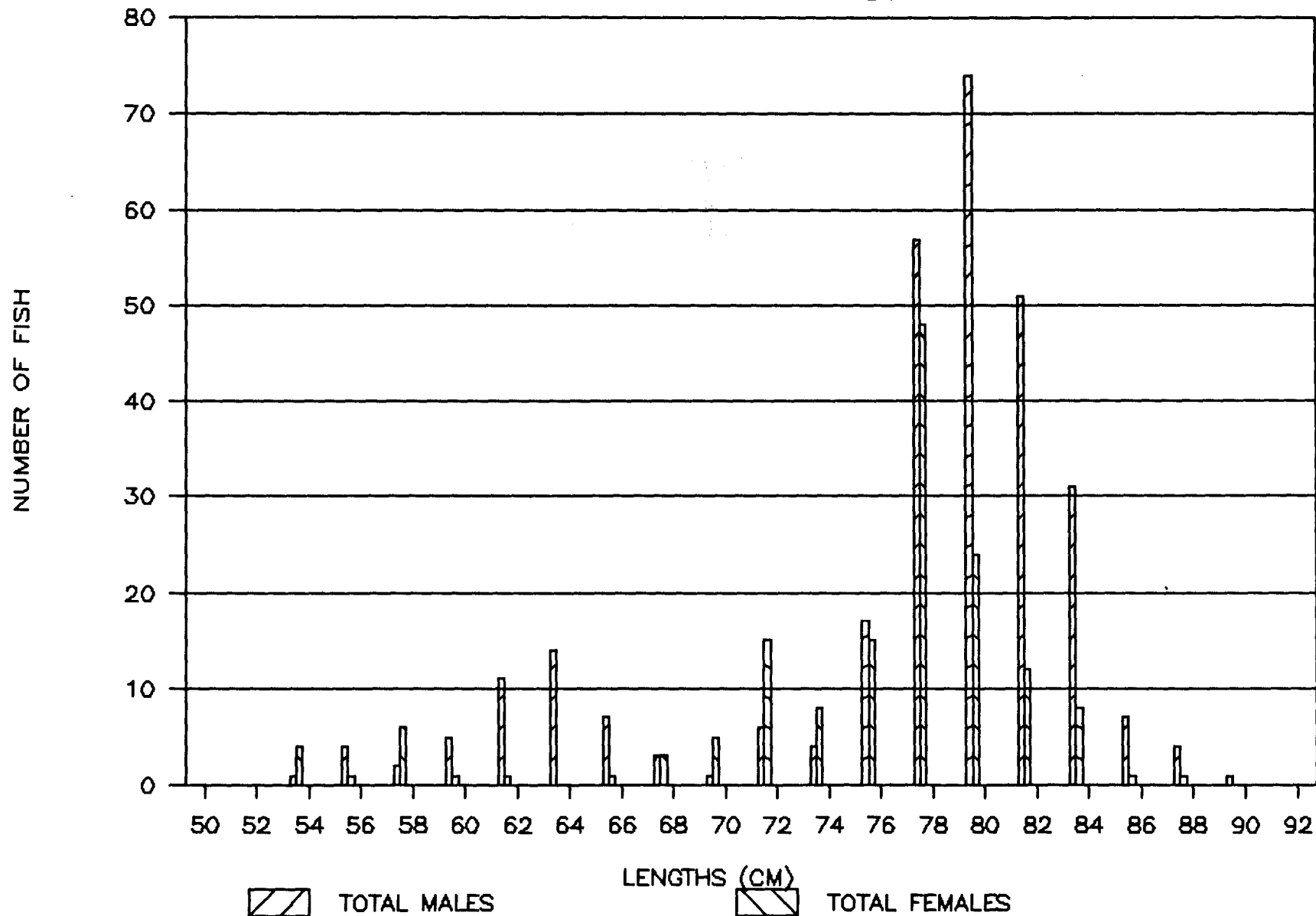
1990 — Number of fish = 454



Appendix 21. Adult steelhead length frequency, East Fork.

# LENGTH FREQUENCY FOR EAST FK. STEELHEAD

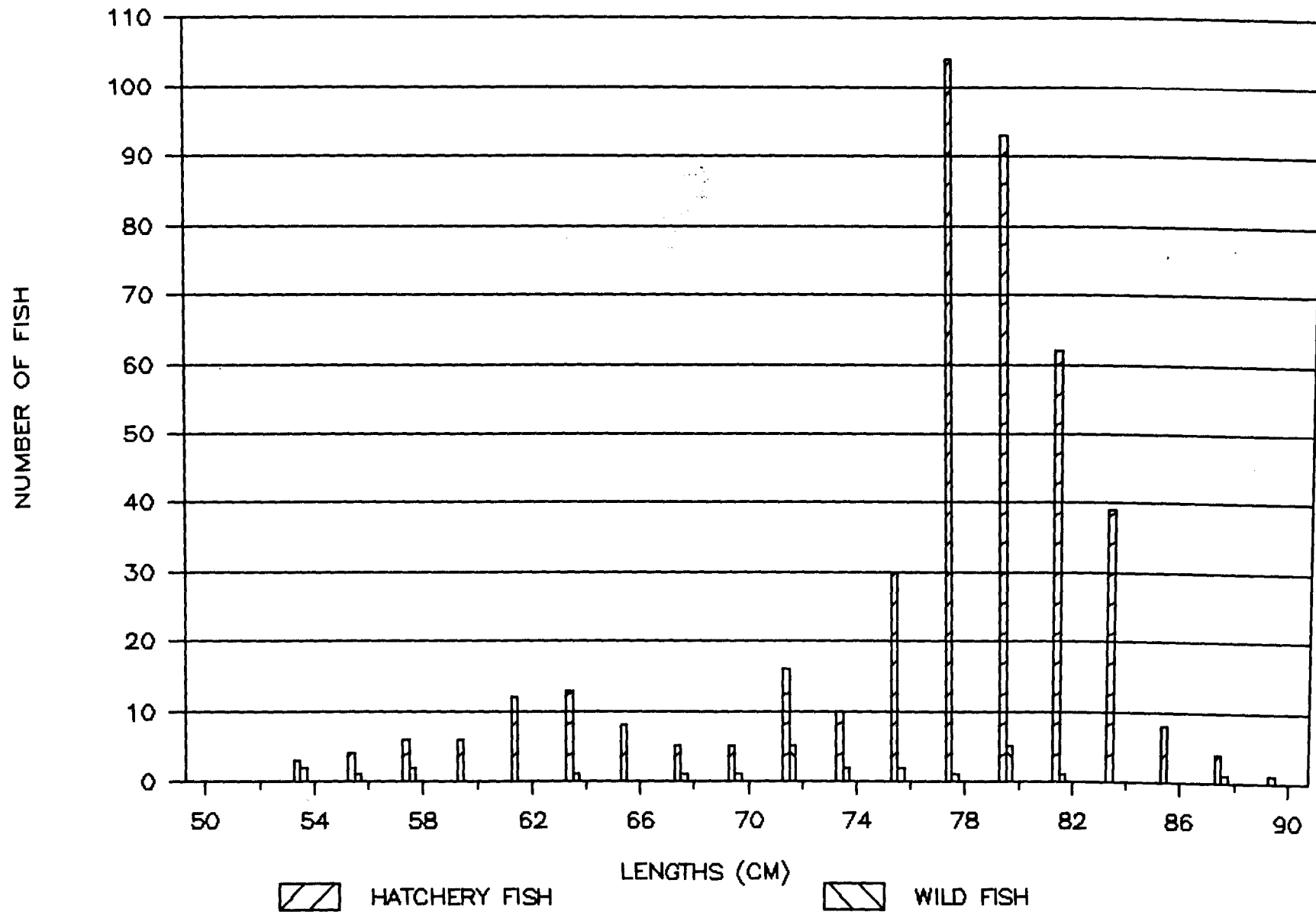
1990 - Number of fish = 454



Appendix 22. Adult steelhead length frequency, males and females, East Fork.

# EAST FK. HATCHERY VS WILD STEELHEAD

1990 - Number of fish = 454



Appendix 23. Adult steelhead length frequency, hatchery vs wild, East Fork.

Submitted by:

Richard D. Alsager  
Fish Hatchery Superintendent III

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

A handwritten signature in black ink, appearing to read "Steven M. Huffaker", written over a horizontal line.

Steven M. Huffaker, Chief  
Bureau of Fisheries

A handwritten signature in black ink, appearing to read "Bill Hutchinson", written over a horizontal line.

Bill Hutchinson  
Fish Hatcheries Manager